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NSF Smart and Connected Communities 2021 Info Session

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NSF Smart and Connected Communities

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Topics for Today

Brief Overview of the NSF Solicitation

- This Info Session will cover:
  - S&CC Integrative Research Grants (SCC-IRGs) Tracks 1 and 2
  - S&CC Planning Grants (SCC-PGs).
- This session will NOT discuss:
  - S&CC Virtual Organization (S&CC-VO) Proposals
  - Joint Research Collaboration with the Japan Science and Technology Agency (JST)

Pitches

Networking?

Timeframe

- Solicitation, Nov 27, 2020
- Info Session: Jan 08
- Transmittal Due Date: Feb 17
- Sponsor Due Date: Feb 24

ORSP Announcement: http://research.olemiss.edu/NSFssc2021

NSF S&CC Program Page: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505364

NSF Webinar and Slide from 2016 ((much has changed since 2016 though):
https://www.nsf.gov/events/event_summ.jsp?cntn_id=190025&org=CISE

NSF FAQ from 2016 (again, much has changed since then):
https://www.nsf.gov/pubs/2017/nsf17025/nsf17025.jsp?org=NSF

List of recent awards from this program:

https://www.nsf.gov/awardsearch/advancedSearchResult?ProgEleCode=033Y&BooleanElement=Any&BooleanRef=Any&ActiveAwards=true&#results

PAPPG 20-1: https://www.nsf.gov/pubs/policydocs/pappg20_1/index.jsp
Proposal and Awards Policy Guide

E-Grove (this presentation): https://egrove.olemiss.edu/research_presentations/

S&CC Goal

To accelerate the creation of the scientific and engineering foundations that will enable smart and connected communities to bring about new levels of economic opportunity and growth, safety and security, health and wellness, accessibility and inclusivity, and overall quality of life.

S&CC Proposal Category: Integrative Research Grants Track 1 & Track 2

(Does NOT Require a Preliminary Proposal in 2021)

- Goal is to develop integrative research understanding in aspects of S&CC meaningful to communities, and by example point the broader research community toward S&CC research frontiers.
- Awards in this category will support fundamental, integrative research and the building of research capacity with substantive community engagement.
- **Integrative Research Grants (SSC-IRG) –Track 1**
  - Awards will provide up to four years of support for projects at a level not to exceed $2,500,000 for the total budget.
- **Integrative Research Grants (SCC-IRG) –Track 2**
  - Awards will provide up to three years of support for projects at a level not to exceed $1,500,000 for the total budget.

S&CC Planning Grants:

Awards funded in this category will provide support for a period of one year and may be requested at a level not to exceed $150,000 for the total budget.

PG awards should prepare project teams to submit well-developed SCC-IRG proposals near or after the conclusion of the planning grant.

These awards will support a range of planning activities intended to, for example:

- foster the research to effectively integrate multiple disciplinary perspectives;
- explore community contexts and build collaborations with relevant stakeholders;
- hone research gaps, questions, and hypotheses.

Activities within scope include, but are not limited to, travel, multidisciplinary workshops, stakeholder meetings, data collection, preliminary experiments, and pilots.

S&CC Eligibility Information

- Limit on number of proposals per PI or Co-PI: 2
  - An individual may appear as PI, co-PI, Senior Personnel, or Consultant on no more than two proposals submitted in response to this solicitation.
- There are no restrictions or limits on number of proposals per organization.

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S&CC Integrative Research Grants: Integrative Research

These awards will support integrative research that addresses fundamental **technological** and **social science** dimensions of smart and connected communities and pilots solutions together with communities.

S&CC Integrative Research Grants: Sustainability

The program is interested in projects that consider the **sustainability of the research outcomes beyond the life of the project**, including the scalability and transferability of the proposed solutions.

This includes, for example, projects that consider pursuing collaborations that link research outcomes to planned efforts within the community, identify joint investment models for implementing innovative research solutions, or consider how research will be transitioned to full-scale implementation, if successful.

S&CC Integrative Research Grants: Cloud Computing

S&CC research and education activities **may also benefit from access to cloud computing platforms**, which provide robust, agile, reliable, and scalable infrastructure. In particular, real-time data acquisition, storage, as well as tools for machine learning and data analytics could be leveraged through these platforms.

Proposals may request cloud computing resources to use public clouds such as Amazon Web Services (AWS), Google Cloud Platform (GCP), Microsoft Azure, and IBM Cloud. Cloud computing resources may be obtained through CloudBank (CloudBank.org).

Components Required for Proposals

1. Integrative Research (IRG and Planning Grant Proposals)
2. Community Engagement (IRG and Planning Grant Proposals)
3. Management Plan (IRG Proposals Only)
4. Evaluation Plan (IRG Proposals Only)
5. Scope and Scale (IRG Proposals Only)

Integrative Research Component (IRG and Planning Grants)

Projects must address both the technological and social science dimensions of smart and connected communities and describe how the dimensions are integrated together.

Proposals should engage the multidisciplinary perspectives of scientific areas supported by participating NSF directorates.

Integrative research may address a range of application domains including, but not limited to, the following:

agriculture, civil infrastructure, disaster mitigation and response, energy, environmental quality, learning environments, health and wellness including healthcare, human services, accessibility and inclusivity, workforce development, resiliency, safety, social services, telecommunications, transportation and mobility, urban and rural planning, and water resources.

Integrative Research Component: Disruptive, High-Risk

- In this round, we also encourage submission of proposals that advance disruptive technologies and concepts that may involve high-risk, high-reward approaches or significantly advance theoretical foundations of S&CC sociotechnical research.

- In either case, the proposal must span social and technical dimensions with community engagement.

Integrative Research Component: Technological Dimensions

Technological dimensions include, but are not limited to, the following:

1. data integration and management, and computing and network resource management;
2. new algorithms and modeling frameworks for understanding and exploiting high volumes of diverse and complex infrastructure- and community-related data;
3. systems engineering approaches for integrating cyber, physical, and social concerns in a large-scale system-of-systems context with multiple stakeholders;
4. ubiquitous and persistent connectivity to enable data collection and instantaneous dissemination of information;
5. improved cybersecurity and privacy;
6. innovations in integrating materials, sensors, structures, and systems to support smart and connected communities;
7. design of interfaces, controls, and feedback systems; and
8. innovative concepts for advanced infrastructure systems and services, including dual-use sensing and flexible infrastructure that supports multiple uses and applications.

Integrative Research Component:
Social Science Dimensions

Social science dimensions include, but are not limited to, the following:

- innovations facilitated by intelligent technologies and focused on community behavioral or social change experiments and/or STEM teaching and learning;
- studies of learning or collaboration processes within and across communities, including STEM education research;
- data describing long-term responses of communities to existing or predicted adversities or disasters;
- improved empirical methods for measuring and predicting community opportunities and challenges;
- innovations in the evaluation of community interventions; and
- evidence of institutional and social responses to technological change within communities.

Innovative Research Component: Examples projects…

Technological and social science dimensions should be explored in concert as they impact one another in the short, medium, and long terms.

- Collection, analysis, and use of data and information from multiple heterogeneous sources to support existing communities in identifying economically viable and sustainable options to improve quality of life;
- Real-time adaptation of systems and infrastructures in response to changing needs and behaviors of the community by harnessing and autonomously handling data;
- Innovative concepts for flexible services and infrastructures that are responsive to community evolution, while sustaining diversity within communities as well as its ecosystem services;
- Prediction, analysis, and mitigation of physical, cultural, socio-economic, legal, institutional, and ethical challenges to smart and connected communities, including unintended or indirect consequences of new technologies, forms of data, and infrastructures;

Innovative Research Component: Example Projects, cont.

- Assessment of the role of emerging technologies in enhancing workforce and learning opportunities, such as tools to shape human-technology partnerships; development, adaptation, and/or evaluation of STEM teaching and learning efforts and resources; improvements in career
- longevity and job satisfaction, workforce capacity, and performance; and facilitation of lifelong learning, including of new skills and perspectives related to smart and connected communities;
- Innovative approaches, infrastructure, and/or STEM educational research that supports a significantly more equitable and inclusive distribution of new technology opportunities and resources;

Innovative Research Component: Example Projects, cont.

- Novel methodologies, algorithms, and representations to enable human-centered design and engineering of capabilities, services, infrastructures, and other systems that are seamlessly integrated into the fabric of smart and connected communities;
- New technologies and practices to improve decision making under uncertainty, including to evaluate and mitigate risks, associated with highly complex systems (spanning technologies, infrastructures, and the community) over the short-, medium-, and long-term; and
- Advances in computational science, neuroscience, and psychometrics; theories of the brain, emotion, learning, and societal forces that will advance cyberlearning; distributed intelligence; knowledge-building communities; formal or informal educational environments; knowledge management; and communities of practice for a diverse and innovative workforce.

Community Engagement Component

What are communities?

- Physical, geographically-defined entities, such as towns, cities, neighborhoods, community districts, or incorporated rural areas, and tribal regions
- Diverse and varied populations;
- Governance structure; and
- Ability to engage in meaningful ways with the proposed research activities.

Community Engagement Component

Note that the nature of the community engagement will vary based on proposal category.

For **Planning Grant p**roposals, community engagement should be integral to planning and establishing research direction-setting.

For **Integrative Research** proposals, the community engagement is expected to be more substantive.

Community Engagement Component

Proposals should clearly identify and define the community and participating community stakeholders, and also describe activities that reflect meaningful community engagement.

This engagement should consider community stakeholders as integral to the research.

Investigators and community stakeholders are encouraged to work closely to develop, pilot, and evaluate creative approaches to accomplish the goals of the proposed research.

Consider involving as a community stakeholder, a decision maker who has the potential to act on the results of the research.

Community stakeholders are encouraged to have leadership roles within the proposing team, including as a PI or co-PI if appropriate for the project, and are encouraged to be active participants in the project and proposal formulation.

Community Engagement Component

Community stakeholders may include some or all of the following: residents, neighborhood or community groups, nonprofit or philanthropic organizations, businesses, as well as municipal organizations such as libraries, museums, public works departments, educational institutions, and health and social services agencies.

In addition, community stakeholder engagement may leverage partnerships with regional stakeholders, including local, county, and state governments and departments as well as regional cooperative initiatives.

PIs are also encouraged to work with existing stakeholder groups in the community or through academic institutions with existing community initiatives.

Example Community Engagement Activities

Conceiving of and supporting research demonstrations, experimentation, proofs of concept, or pilot activities;

Participating in “living labs” where technological, and social advances, and educational research are staged iteratively through pilot studies in communities;

Helping to define or create metrics and support data collection and/or interpretation within the community context;

Public participation and engagement in data collection, including through crowdsourcing and community science;

Holding roundtables, community meetings, or conducting surveys to understand community member needs and concerns, and to develop and refine the research;

Providing data, facilities, resources, and expertise instrumental to the project;

Pitches

Scheduled Pitches

Impromptu Pitches

UM Community First Research Center for Wellbeing & Creative Achievement (UM CREW)

Co-Directors

Meagen Rosenthal and Annie Cafer

Mission

To **empower** Mississippi communities to create and **use evidence** and the arts to improve all aspects of community wellbeing using CBPR best practices and leveraging institutional resources and expertise.

"Communities" for the purposes of this work is defined very broadly and can include, but is not limited to, county, city, municipal agencies, local and state non-profits, groups of citizens.

Vision

Our vision is to foster resilient communities in Mississippi. To help build communities that can withstand the stresses of natural, economic, and social disasters, by addressing social, educational, and economic inequalities.

We hope to become a go-to resource for communities in Mississippi to create, learn about, access, analyze, and apply knowledge and data to improve community quality of life.

Goals

- Coach/advise Mississippi citizens, communities, and decision-makers, how to create, access, analyze, and apply data in local and regional decision-making
- Be a resource for communities in collecting pilot data, writing, and submitting funding-grants to improve community wellbeing
- Be a resource for communities in helping to design community humanities and art workshops and projects (visual art, music, dance and theatre)
- Act as a facilitator between UM researchers and Mississippi communities in need of researchers' skills

Support

If you are thinking about developing a planning grant or integration proposal for the current solicitation, please let us know as soon as possible.

If you are interested in exploring the possibility of a proposal to a future solicitation for this program, let us know that as well. We may be able to provide additional services in support of your exploration.

E-mail: orspresdev@olemiss.edu.